

THE NECESSITY OF ENVIRONMENTAL MEDICINE, Part I
David G. Schwartz, M.D., 30 July 2020

In previous articles I explained detoxification in general, a necessary part of our health, especially important in the age of pollution. This would not have to be so, if we all demanded a stop to the wanton release of tons of unnatural chemicals into our world, many of which have had no tests for safety. Regulators, captured by the industries they are supposed to regulate, would in many cases rather wait until untold damage occurs, causing widespread sickness and death, before taking action. The Clean Air Act of 1970 has done some good, but we are far from where we should be for a safer environment. Chemical pollution is clearly documented to be a causative factor in nearly all chronic diseases that used to be rare 100 years ago. This chronic disease burden makes people vulnerable to severe illness and death from pandemics caused by novel viruses. We need to train and support people in clean living and countering the effects of pollution to reduce chronic illness, not just counting on new vaccines and new drugs to lessen the effects of pandemics, often too late anyway. Real public health requires proactive efforts to improve people's health and to reduce risks of disease. Environmental Medicine steps in with secondary prevention when primary prevention (stopping the pollution) has failed us.

Walter J. Crinnion, N.D., and Joseph E. Pizzorno, N.D., published a most thorough and comprehensive textbook on clinical environmental medicine in 2019. It introduces 1. The science of environmental medicine, 2. The various sources of pollution, 3. The many types of toxicants, 4. Their systemic effects on the body, 5. Various methods of assessment of toxic load, 6. The bio-transformation and excretion process, and 7. Therapeutics, including amelioration or reducing the effects of toxins still in the body.

Why do nonprofessionals and professionals alike need to know this? First, most health professionals don't have a clue about how to comprehensively assess exposure, toxic load, and specific elimination therapies. Doctors and laboratories who try to help people with environmental illness are targeted and harassed as "quacks." Second, people who do consult with environmental practitioners about specific health conditions need to understand the complexities of evaluation and treatments. Third, the general population needs to know what we are up against, and this may nudge people into political activism.

Dr. Walter Crinnion practiced medicine for 30 years, one of the foremost experts in environmental medicine, and as a widely known lecturer and teacher. He wrote Clean, Green, and Lean, about which I did a report, available in the archives. I have personally attended many of his lectures and was impressed with his thoroughness and practicality. Dr. Joseph Pizzorno, physician, educator, researcher, is founding president of Bastyr University, a major naturopathic medical school, the first NIH funded center for alternative medicine research. These two have teamed up to write a phenomenal, comprehensive, and practical textbook.

William J. Rea, MD, FACS, FAAEM, founder of the Environmental Health Center in Dallas, author of many books on environmental medicine, and winner of many awards, writes the Foreword to this book.

Dr. Rea explains the difference between toxicity, which is poisoning, and sensitivity, in which the person has heightened sensitivity to lower levels of pollutants. This hypersensitivity is becoming more common, because people are being exposed to frequent and low levels of multiple substances. We also

now have a large population of non-optimal functioning, fatigued, sluggish people, dependent on methods of suppressing symptoms, not knowing that the problem is caused by toxicants.

Understanding these symptoms can be tricky, because of *biochemical individuality*, the variability of different peoples' ability to detoxify. Also the substances can cause a *stimulated* and a *depressed* phase, with a different set of symptoms occurring at different times. The *masking* or *adaptive phenomenon* occurs when the person gets used to the substance temporarily, but though it appears harmless, it stealthily causes damage as exposure continues. Then the *spreading phenomenon* occurs in which one organ at first is injured, and then later the damage occurs in other organ systems one by one.

The book first defines some terminology. *Toxins* are produced by living organisms, microbes, etc., and by the body itself. *Toxicants* are substances not produced by living organisms, i.e. synthesized chemicals (xenobiotics), heavy metals, etc. *Poisons* are toxins that can cause immediate illness or death, even in small amounts.

A word about *persistent organic pollutants* (P.O.P's) is appropriate. The United Nations Environmental Programme defines them as "chemical substances that persist in the environment, bio-accumulate through the food web, and pose a risk of causing adverse effects to human health and the environment." These substances get transported long distances to regions where they were not produced or used. The international community has called for urgent global action to reduce and eliminate release of these chemicals. These are mostly chlorinated compounds that are not water soluble, but fat soluble, for which reason they are found in human fat, and they can persist there for several decades in the same person.

Factors that determine the significance of environmental toxicants are: genetic polymorphisms, nutrient deficiencies, dietary choices, stressors, lifestyle choices, overall health, infections, the makeup of the microbiome, and exposure to electromagnetic fields.

The main mechanism by which chemicals cause toxicity is due to oxidative damage. Oxidative stress has long been known to mediate many chronic diseases such as cancer, heart disease, diabetes, etc. These toxicants generate free radicals which promote various pathways of inflammation, and they oxidize and damage DNA, and diminish the activity of the body's natural antioxidant systems.

The main sources of toxicants are: food pollution, water pollution, indoor air pollution, outdoor air pollution, "health" and beauty products, and drugs.

Food is most commonly contaminated by organophosphate and pyrethroid pesticides, POP's, plasticizers (Bisphenols), and heavy metals. The most contaminated foods are sardines, farmed salmon (PCB's and organochlorine pesticides), large carnivorous fish (mercury), conventional meats (POP's), and the "dirty dozen" fruits and vegetables. (organophosphate pesticides). The best protection is to eat only certified organic foods, peel non-organic produce, and wash non-organic produce in alkaline or acid wash. Plasticizers are in plastic wrapped foods, and bisphenols (BPA, BPS, etc.) are in canned foods and beverages. Solvents come from styrofoam and "microwave safe" food containers. Glyphosate mainly comes from non-organic soy and grains. Aluminum is transferred from aluminum cookware, and is in some processed foods. Arsenic comes from fish, rice, poultry, and tap water, cadmium from non-organic soy and sunflower seeds, mercury mostly from fish (tuna and farmed salmon). Organic food has lower levels of these contaminants than non-organic, but they are not pesticide-free. Pesticides can drift on the wind to organic farms.

Water pollution comes primarily from agricultural, industrial, and geological sources. These are micro-organisms, disinfectants, disinfection by-products, such as trihalomethane, chloroform and bromoform, lead, arsenic, hexavalent chromium, pesticides and herbicides, perchlorate, and other miscellaneous chemicals.

Indoor air pollution comes partly from outdoor air pollution getting inside, but also largely from out-gassing of many sources inside buildings. In some areas, concentrations of 40 different volatile organic compounds (VOC's) are 10 times higher than outdoors. The solvents are VOC's and chlorinated solvents. The most common VOC's are paradichlorobenzene from air fresheners and moth balls, styrene from plastics, foam rubber, and insulation, tetrachlorethylene from dry cleaning, benzene, toluene, ethylbenzene, and xylene from smoking and attached garages, and solvents from recent renovations and fragrances. Indoor chloroform levels come from chlorine-based disinfectants released from hot water in showering. Numerous solvents are present in air fresheners, including formaldehyde, toluene, xylene, and benzene, as well as diethylphthalate (DEP).

Semi-volatile organic compounds (SVOC's) are found more in airborne dust particles and attached to fabric. More pesticides are found in carpet dust than in the air. Household dust is the primary source of polybrominated diphenyl ethers (PBDES) found in human serum, and it also has polychlorinated biphenyls. Phthalates like DEHP are found in dust from polyvinylchloride (PVC) flooring, foam mattresses, shower curtains, and other plastic materials. DEHP is released also into the air directly by fragrances and plug-in air fresheners. Polycyclic aromatic hydrocarbons (PAH's) come from burning candles, incense, natural gas, and from indoor smoking. PAH's are also brought in on shoes and retained in carpet dust. Perfluorocarbons (PFC's) from Teflon (PFOA's) cookware and Scotchguard (PFOS) are commonly found in dust.

Mold contamination is common in water damaged buildings (50% of buildings in North America). Molds produce mycotoxins, and bacteria produce endotoxins. These can produce allergic reactions and asthma, and mold colonization in the body with severe mold illness. See my article on [Break the Mold](#). The Environmental Relative Moldiness Index (ERMI) identifies homes with higher mold presence. Modern construction with "air tight" buildings and Heating Ventilation Air Conditioning (HVAC) systems concentrate all indoor pollutants because of lack of ventilation with outside air.

Furnishings can contribute to Sick Building Syndrome (SBS) especially new wall-to-wall carpeting that out-gasses many volatile and semi-volatile compounds, including formaldehyde, pyrethroid pesticides, brominated flame retardants, styrene, and many other compounds with long names. Green buildings that are Leadership in Energy and Environmental Design (LEED) certified have much lower levels of pollutants, and people have much reduced symptoms of SBS after moving into them.

To have a cleaner building, these measures make a big difference: Eliminate off gassing sources. Remove carpeting. Dust control – Replace HVAC filters with electrostatic pleated filters with minimum efficiency reporting value (MERV) rated 7 or higher. High quality HEPA and charcoal air purifier units. Indoor plants that clean VOC's, such as Mother-in-Laws's Tongue, Spider Plant, Gerbera Daisy, and *Dracaena deremensis* (Janet Craig).

Outdoor air pollution, on a global scale, accounts for 3 million premature deaths per year, and it contributes to 6 out of the top 10 major causes of death. The EPA, in implementing the Clean Air Act of 1970, designated the 6 most common and most deadly pollutants: Particulate matter (PM), ground level ozone, carbon monoxide (CO), sulfur oxides, nitrogen oxides, and lead. Particles less than 10 micrometers in size (PM₁₀) are readily absorbed in the lungs and then spread throughout the body, and

can travel from the nose to the brain via the olfactory nerve. A single exposure could leave these particles in the body for several days, including lungs, liver, and blood, and they slowly decrease over several months. People with constant daily exposure would be expected to have these toxicants throughout their bodies. PM's cause oxidative damage, and they are related to cardiovascular, respiratory, and cancer mortality.

Ground level ozone is formed from interaction of sunlight with VOC's or nitrogen dioxide (NO₂). It causes airway irritation and inflammation, promotes bronchitis and pneumonia, decreases lung function in urban joggers, damages the cardiovascular system, and causes increased mortality in urban dwellers.

Carbon monoxide (CO) from combustion, reduces oxygenation throughout the body.

Sulfur oxides from combustion of coal and other fossil fuels increase asthma and preterm delivery.

Nitrogen oxides, especially NO₂, increase allergies, asthma, and lung damage.

Lead, since removal from gasoline, now comes mainly from dust, foods, and indoor air.

Air mercury comes from coal-burning plants and cement plants. Ninety per cent of exposure to PM comes from diesel exhaust particles (DEP's), that have carbon cores, to which are attached hundreds of chemicals and metals, including PAH's that come from burning almost anything. Bio-diesel is no less toxic than standard diesel fuel. Diesel exhaust is the major source of PAH's including the carcinogen, benzo-a-pyrene. VOC's or solvents come mainly from vehicular exhaust, and the most common ones, benzene, toluene, ethyl benzene, and xylene (BTEX) comprise 27% of every gallon of gasoline. Refineries and chemical plants release many of the VOC's daily into the air. Tens of thousands of fracking wells emit tons of "PAH's and VOC's daily into the air. Agricultural pesticides and herbicides are found in air, rain, snow, and fog all across the US, and they "leapfrog" around the globe.

Adverse health effects from outdoor air pollution include cardiovascular, respiratory, immunological, neurological, and reproductive effects. People living close to a major roadway have a much higher risk of dying from a heart attack than people living more than 100 meters away, and they also have a much higher risk of allergies and asthma. Exposure to PM_{2.5} is a major threat to cognitive function. Outdoor air pollution results in lower birth weights and DNA damage to offspring, and it reduces sperm counts and viability.

Personal Care Products (PCP's) have numerous chemicals not listed on the containers, and 95% of women and 75% of men have daily multiple contacts with cosmetics. The FDA does not require labeling chemical constituents of fragrances and incidental ingredients, as they are "trade secrets." So it is difficult to evaluate their toxicity. Also no determination is made of the synergistic effects of several ingredients. One thing is known, that each xenoestrogen by itself has no observable effect at a certain concentration, but several such xenoestrogens taken together at that concentration do have demonstrable hormone disrupting effects, and we do not know the thresholds for those concentrations to have an effect. So the best thing is to avoid them if we don't want trouble, or get all organic cosmetics.

The major problem with PCP's is their endocrine and reproductive disruption. The main endocrine disruptors are phthalates, parabens, triclosan, sunblocks such as benzophenone-3, and toxic metals. Parabens are the most common ingredients (besides water) in cosmetics and are in 80% of PCP's, including hand soap, shampoo, toothpaste, and sunscreen. Besides being estrogenic, they inhibit the

enzymes that transform estrogens for excretion, they inhibit mitochondrial function, and they are associated with infertility. Phthalates hold scent and act as solvents in many PCP's. Diethylhexyl phthalate (DEP), is found in 71% of all cosmetics, in 100% of fragrances, and 86% of hair gels. Most infants (81%) have 7 or more urinary phthalate metabolites. Like parabens, phthalates also interfere with mitochondrial function, and are linked with infertility, obesity, and diabetes. Phthalates interfere with several aspects of thyroid function. They interfere with uptake of iodine, inhibit uptake of T₃, and interfere with transport of thyroid hormone. Phthalates promote breast cancer, and phthalates in mothers are associated with a 7 point drop in IQ in the offspring at age 7. People with higher levels of phthalates are twice as likely to be depressed as people with lower levels.

Triclosan is a chlorinated bacteriocide, ubiquitous in PCP's, in 75% of liquid soap, and it can be found in all body fluids, fatty tissue, and nails. It also interferes with thyroid function and reproduction, and it inhibits detoxification enzymes.

Ultraviolet filters (sunscreens), 16 kinds approved by the FDA, accumulate in body fluids and organs. The common filters disrupt estrogens, androgens, progesterone, and thyroid.

It is difficult for consumers to assess the level of toxicity of various products. The websites of Good Guide, Green Seal, and Environmental Working Group can help. My personal view is that we don't need most of these products anyway.

In the next article(s) I plan to describe specific toxicants' effects on the different systems in the body, the mechanisms and methods for their avoidance and removal, and nutrient supplementation and foods that help.